

Is 'durum wheat - winter pea intercropping' efficient to reduce pests and diseases?

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OBJECTIVES

- **Pests and diseases** are often a major concern, particularly in low inputs systems where no or few pesticide treatments are performed.
- Intercropping (IC) can allow a **significant reduction in harmful insects and diseases** compared to sole cropping (SC) (e.g. Kinane and Lyngkjær, 2002).
- No reference on winter crops IC was available, despite winter crops seems more adapted to Southern Europe conditions.
- **Aim of our study: Evaluate the assumption that Durum wheat – Winter pea intercropping (IC) is more efficient than sole crops (SC) for their ability to reduce pests and diseases by:**
 - Comparing dynamics of green aphids and weevils (two main pea pests) between SC & IC
 - Analysing the development of pea ascochyta (*Mycosphaerella pinodes*) and main durum wheat foliar diseases between SC & IC

CONCLUSIONS

- **Pests and diseases were never increased in IC** but sometimes reduced (ie Pea aphids and Pea ascochyta with fungicide protection)
- Efficiency of 'Durum wheat - Winter pea intercropping' to reduce pests and diseases depends on:
 - Insect behaviour, particularly both its mobility and ability to recognize its target in a mixed cover
 - Disease dispersion which is in interaction with microclimate modification in intercrop
 - Interactions with plant architecture and farming practices, for example the 'umbrella' effect

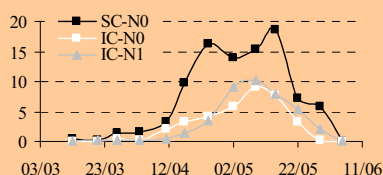
MATERIAL AND METHODS

- An experiment was carried out in Auzeville (SW France) in 2006-2007 on a clay loamy soil. The two species were sown on November 2006 the 9th in **row-intercropping**. The experiment was based on a split-split-plot design with 2 replicates.
- **Three main treatments were compared:**
 - W-SC:** Durum wheat (cv. Neodur sown at 280 seeds/m²) ;
 - P-SC:** Winter pea (cv. Lucy sown at 60 seeds/m²) ;
 - IC:** Durum wheat-winter pea IC, **each specie sown at half of SC density**
- **Two fertiliser-N sub-treatments:** *i)* **N0:** No fertilizer and *ii)* **N1:** 140 kg N/ha
- **Two fungi managements:** *i)* **NT:** No fungicide and *ii)* **T:** 2 applications of metconazole (90 g.ha⁻¹)
- **Measurements made:** *i)* Evolution of pea aphids population ; *ii)* Number of nodules on pea roots and percentage of nodules drilled ; *iii)* Attack of ascochyta on stem, leaves and pods of pea and *iv)* Attack of mildew, brown rust, fusarium and septoria on durum wheat leaves



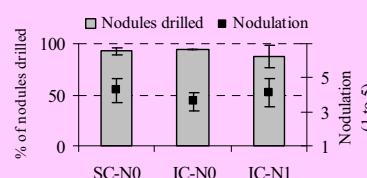
RESULTS

Evolution of pea aphids per plant



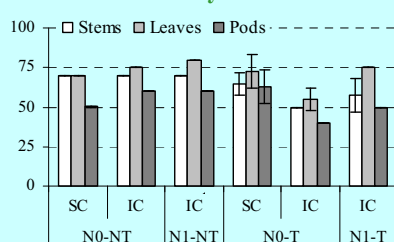
- Small number of pea aphids
- Pea aphids reduced in IC
- No difference in N treatments
- **IC was efficient to reduce pea aphids**
- **Physical barrier of wheat?**
- **Habitat modification?...**

Nodulation and % of nodules drilled



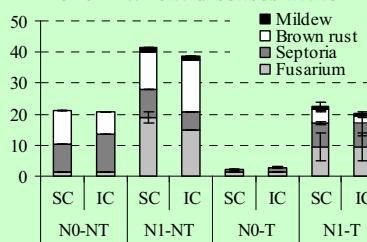
- Nodulation not affected by IC
- % of nodules drilled high and not reduced in IC
- **IC was not efficient against weevils**
- **Great mobility of weevils?**

Pea ascochyta attack



- Stems and leaves more attacked than pods
- Fungicide treatment reduced Ascochyta attack only in IC
- **Efficiency of the fungicide in IC is increased because of the reduction of pea DM ?**

Durum wheat diseases attack



- Diseases not reduced in IC
- N increased wheat diseases
- Wheat diseases reduced by fungicide application
- **IC was not efficient to reduce wheat diseases this year**

Summary: Durum Wheat - Winter Pea intercropping reduced aphids but not weevils perhaps because of differences in insect mobility
Durum Wheat - Winter Pea intercropping seems not efficient to reduce wheat fungi diseases but efficient against pea ascochyta